

REMARKS

Applicant thanks Examiner for pointing out the difficulties associated with "bullets" and has removed them from the claims as requested.

Applicant thanks Examiner for acknowledging the claim to priority from US Provisional Application 60/227,556, filed 8/23/200.

Examiner objected to claims 52-57 due to the misspelled term "envelop". The claims have been amended to correct this misspelling.

I. Claim Rejection - 35 USC § 112, 2nd Paragraph

Examiner rejects claims 52-57 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner asserts that:

Claims 52 and 55 recite "determining if at least three panels exist, and if so." The limitation "and if so" is indefinite, as it is unclear what active method steps is intended in the case where less than three panels exist.

Applicant notes that the claims in question need not disclose active steps to be taken in the alternate as the claims as written clearly the method that achieves the desired result, namely, the calling, and reporting, of alleles. Should the test of determining if at least three panels exist, not be successful, any number of other methods could be employed. These include stopping, employing an alternate method of calling, or any number of other steps. This structure is indicated by the open "comprising" transitional phrase as described in MPEP 2111.03.

The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not

exclude additional, unrecited elements or method steps. See, e.g., *Mars Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376, 71 USPQ2d 1837, 1843 (Fed. Cir. 2004) ("like the term 'comprising,' the terms 'containing' and 'mixture' are open-ended.")

None of these other branches are required to achieve the desired result. Because of this, Applicant respectfully requests that Examiner withdraw the rejection.

II. Claim Rejections - 35 USC § 101

Examiner rejects claims 52-57 under 35 USC § 101 as being drawn to non-statutory subject matter. In particular, Examiner asserts that,

the claims must be limited only to statutory embodiments. In the instant case, the claimed computer readable medium encompasses non-statutory embodiments of computer readable media drawn to carrier waves, as set forth in the specification [p.38, fl3]. Because carrier waves are not a tangible medium, the instant claims do not recite a tangible result in a form that is useful to the user of the process. This rejection could be overcome by amendment of the specification to delete limitations directed to carrier waves.

The specification has been amended as suggested by Examiner and Applicant respectfully requests that the rejection be removed.

III. Claim Rejection – 35 USC § 103

Rejection A. Examiner rejects claims 52-57 under 35 U.S.C. 103(a) as being made obvious by Ng (Automating Computation Molecular Genetics, Thesis Dissertation, Carnegie Mellon University, School of Computer Science, 1998, Abstract and p. 1-389),

in view of Gilchrist et al. (US 5,916,747; Issued Jun. 29,1999). In the rejection, Examiner draws a number of equivalencies between the references and present application. Applicant, argues that these comparisons are inappropriate since the elements in the references do not map onto the limitations of the present claims.

For example, Example makes the following statement

Ng shows plotting a fitted profile of the original electropherogram signal [p.98, Fig. 5.10], which is broadly interpreted as a signal envelope.

Applicant argues that the “fitted profile” is not the equivalent of a signal “envelope”, even if the term fitted profile is construed broadly. Ng’s fitted profile is a direct approximation of the underlying signal itself as illustrated in Ng’s figure 5.10, whereas the present application’s envelope is a determined by a defined process of data reduction whereby the initial signal is modified by retaining only the signal’s maxima (see page 14 of the specification, line 1). This point is demonstrated by comparing figure 7 of the application to figure 5.10 of Ng. Figure 7 clearly shows an envelope that in no way is similar to the fitted profile. The envelope is an entirely new signal derived from the original signal and the envelope possesses markedly different characteristics than the fitted profile. The fitted profile is a model whose goal is to approximate the original signal as closely as possible, whereas the envelope greatly decreases the dimensionality of the original signal and local minima information between the stutter peaks is completely lost. Applicant has clearly defined within the specification of the application, the meaning of the term envelope and it in no way resembles Ng’s fitted profile. Thus, Ng does not contain an element that maps onto the envelope limitation and Applicant respectfully requests that the rejection removed.

Also, Examiner states that,

Ng shows algorithms (i.e. tests) for enumerating over candidate alleles based on ratios, and locally searching for best amplification ratios in a

specified range (i.e. window) based on a "sum of squares" error calculation [p.142, Box 6.8]. ... Therefore Ng clearly teaches the calculation of energy in each "binned" region based on a "sum of squares" technique, as in claims 52, 54, 55, and 57.

The sum of square errors calculation that the Examiner refers to is applied to the vectors of the stutter matrix. ("Use the sum of square error between the predicted vector Ax^{ij} and the observed data vector y as an error measure in the search." See Ng, page 142 Box 6.8, Step 3). Since the "sum of square errors" is clearly stated to apply to vectors, Ng cannot clearly teach the calculation of energy in each "binned" region as Examiner asserts, because no binned regions are used. Thus, Ng does not contain an element that maps onto the present application's limitation of "Computing an energy value for each panel" and Applicant respectfully requests that the rejection be removed. Also, since the element is not present, Examiner's statement,

Furthermore, as discrete allele data representing "binned" data are obtained from signal peaks with the maximum intensity [p. 143, Fig. 6.12, Top and Middle Windows], and thus the application of the above algorithms to obtain candidate alleles [p. 145, Fig. 6. 13] includes "panels with the greatest energy" corresponding to "maximum intensity" values, as in claims 53 and 56.

cannot logically follow and is immaterial to the present rejection.

Examiner states that, "Ng does not specifically teach dividing the signal envelope into panels with boundaries at each local minimum." Applicant agrees with this statement especially since Ng does not teach the use of an "envelope." Examiner uses US 5,916,747 to provide this element and states,

Gilchrist et al. teaches a method for alignment and normalization of trace data signals for improved base calling. In particular, data that

includes creating windows from trace data, determining the peaks of the analysis data, and determining peaks and values (i.e. maxima and minima) [Fig. 4A and 4B] and [Col. 6, lines 40-60]. In particular, the windows occur at peak minima. Gilchrist also show applying algorithms to each point of trace data within a window to modify its position and change the cost area function (i.e. energy).”

However, it is impossible for Gilchrist to teach dividing a signal envelope via local minima because nothing in Gilchrist teaches the use of an envelope or the use of local minima for dividing a signal. Gilchrist deals with the alignment of four electropherograms traces. Applicant fails to see how Col. 6, lines 40-60, as Examiner asserts, remotely teaches “dividing the signal envelope into panels with boundaries at each local minimum.” Because Gilchrist does not teach this, Gilchrist can not be combined with Ng to form the rejection. Applicant respectfully requests that the rejection removed.

Rejection B. Examiner rejects claims 52-57 under 35 U.S.C. 103(a) as being made obvious by Northeastern University (WO/1999/53423; International Publication Date: Oct. 21, 1999), in view of ABI PRISM Genotyper 2.5 User's Manual (PE Biosystems, Copyright 1998, p. 1-354).

Examiner asserts that Northeastern’s “subdivide peaks using derivatives” description on pages 37 and 38 fully describes all limitations of the present application except for teaching computing a first and second ratio of energy values as is claimed in 52, 54, 55, and 57. (see present Office Action, page 8, fourth and third last lines from the bottom.) However, this description makes no mention of the majority of limitation in claim 52, and 55. Specifically, the passage does not mention, “determining the peaks of the fragment analysis data and forming a signal envelope from said peaks, determining the minima and maxima of the signal envelope and dividing the signal envelope into panels with boundaries at each local minimum, determining if at least three panels exist, and if so, computing an energy value for each panel, performing a first test by computing a first

ratio of the energy value in the panel with the second greatest energy value to the energy value in the panel with the greatest energy value and determining if the first ratio exceeds a first threshold and if so, the first test is considered a pass, performing a second test by computing a second ratio of the energy value in the panel with the third greatest energy value to the energy value in the panel with the second greatest energy value and determining if the second ratio exceeds a second threshold and if so, the second test is considered a pass, calling alleles in each of the first and second panels if the first and second tests are passed, and, reporting the allele calls to a user.” Applicant fails to see how Northeastern can serve as a basis for the instant rejection and respectfully requests that the rejection be removed.

Also, Examiner relies on ABI PRISM Genotyper 2.5 User's Manual (PE Biosystems, Copyright 1998, p. 1-354) and specifically [p.210 and p.212] to teach methods for comparing data quality of any peaks based on "ratios" and "sum of squares." However, the concepts of a signal envelope and computation of energy in a panel of that signal envelope are absent. Without these concepts the “ratios” and “sum of squares” mentioned by Examiner lose all meaning since these concepts are not available through the Northeastern reference. Thus the references can not be combined as the Examiner asserts and can not anticipate the present application's claims. Applicant respectfully requests withdrawal of the rejection.

REQUEST FOR TIME EXTENSION and FEE AUTHORIZATION

We request a 3 Month Extension of Time under 37 CFR 1.136(a) with this response. Should any additional fees not submitted with this response be required, please take such fees from Applied Biosystems Deposit Account No. **01-2213 (Order No. 4615).**

Respectfully submitted,

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